REMARKS

Applicants request the Examiner to reconsider the application in view of the following remarks. Claims 1, 2, 4-6 and 13-15 are currently pending. Claims 7 to 11 have been withdrawn from consideration after a restriction requirement. Claim 12 was cancelled. Claim 1 is amended to clarify the in situ addition of anti-static additive(s) and correct typographical errors.

Claims 1, 2, 4-6 and 13-15 were rejected under 35 U.S.C. § 103(a) as purported to be obvious over U.S. Pat. No. 4,578,406 to Volz (hereinafter "Volz") in view of U.S. Pat. No. 3,822,807 to MacDonald et al. (hereinafter "MacDonald") and U.S. Pat. No. 5,677,357 to Spicher (hereinafter "Spicher").. The Examiner states that Volz discloses reticulated polyurethane foams having a volume electrical resistivity of less than 10^{12} ohm-cm at 70 °F, which can be installed in fuel tanks to suppress explosions, but does not disclose a foam density of less than 1.0 pounds per cubic foot (pcf). The Examiner then contends that MacDonald discloses explosion-suppressing polyurethane foams having density less than 1.0 pcf. Finally, the Examiner points to Spicher's disclosure that antistatic additives such as hexafluorophosphate may be added to polyurethane foam. Applicants respectfully traverse the rejection as to claim 1 as amended and all dependent claims.

Pending claim 1 is directed to ***a method*** for suppressing an explosion in a fuel tank. This method comprises the step of installing into a tank a reticulated polyurethane foam having (1) a density of less than 1.0 pcf, and (2) a volume electrical resistivity of less than 10^{12} ohm-cm at 70 °F. Such foam further incorporates antistatic agents, which are added ***in situ*** in the foam forming mixture, either by adding to the polyol component or by adding to the foam-forming mixture at the mix head. Pending claim 15 further specifies that the foam is foamed under vacuum conditions to achieve the lower density foam.

Volz discloses reticulated, conductive polyurethane foams having a volume electrical resistivity of less than 10^{13} ohm-cm, which can be installed in fuel tanks to suppress explosions. Thus, the primary reference, Volz, does relate to methods for suppressing fuel tank explosions. However, as the Examiner has recognized, Volz does not disclose a foam density of less than 1.0 pcf. *See, e.g.*, Example 1 at column 5, lines 62 to 65 and Example 4 at column 6, lines 24 to 27, where the foam density is disclosed as 1.3 pcf. Volz does not teach or suggest that lowering the

density of these foams would be desirable. Nor does Volz teach foaming under vacuum conditions. Nor does Volz teach that ***in situ*** addition of chemical additives (anti-static additives) is suitable for foams intended for use in fuel tanks.

Volz seeks to interpenetrate the foam with a chemical additive, such as a charge agent, ***after*** the foam has been formed, and ***expressly teaches away*** from ***in situ*** incorporation. Volz identifies two ways in which foams may be treated with chemical additives – (1) coating the surface of a foam with a chemical additive and (2) in situ addition by mixing a chemical additive with foam-forming reactants (Col. 1, line 50 to Col. 2, line 2). Volz then notes the significant disadvantages to using in situ addition (Col., lines 3 to 24), and directs persons skilled in the art away from in situ combinations of foaming mixtures with anti-static agents: "The disadvantages of in situ incorporation include the possibility that the desired chemical additive, or a carrier for the chemical additive, will react with the polyurethane foam-forming reactants to adversely effect either the chemical additive itself, the properties of the subsequently formed foam, or the processing of the foam. This generally limits both the nature and the amount of chemical additive that can be incorporated into the polyurethane foam. Another disadvantage is that in situ impregnation is not useful with a volatile or heat-sensitive chemical additive, for the heat of the urethane polymerization reaction will degrade the additive or will volatize and drive the additive out of the foam-forming mixture."

In contrast to Volz's teaching away, claim 1 of the present application as amended requires anti-static agents be combined in situ and surprisingly achieves the combination of desired volume electrical resistivity while maintaining the low foam density. Adding a surface coating to an already formed foam, such as is taught by Volz, adds weight and would necessarily increase density. Applicants seek to improve upon Volz's teaching by making a foam that has a significantly lower density such that the foam may be used in fuel tanks of smaller aircraft and commercial aircraft.

MacDonald installs polyester foam balls, which are openly reticulated, into a container (such as a fuel tank) for explosion suppression. MacDonald's foam balls are created from foams with densities from 12 to 30 kg/m^3, preferably from 12 to 15 kg/m^3 (i.e., can be less than 1 pcf).

Column 1, line 28 and column 2, lines 14-15. MacDonald does not include any antistatic additives in the foam and does not mention electrical resistivity or any problems encountered with charge build up within the tank. The combination of Volz and MacDonald would not result in the method set out in claim 1 since neither reference points skilled persons to use ***in situ*** antistatic agent addition for foams intended to be installed in fuel tanks.

Spicher has nothing to do with methods for suppressing explosions in fuel tanks. Spicher teaches generally that antistatic additives can be added to polyurethane foams. Spicher's general disclosure about antistatic additives does not rebut Volz's express teaching away from ***in situ*** addition of antistatic additives when making a foam for insertion into a fuel tank for suppressing explosions.

There is no suggestion or motivation for combining Volz, MacDonald and Spicher so as to encompass the method of claim 1. As pointed out above, Volz provides no motivation to persons skilled in the art that the reticulated foams taught by Volz would be improved by lowering density, and Volz ***expressly teaches away*** from ***in situ*** incorporation of chemical additives, such as anti-static agents. Spicher is at best cumulative to Volz insofar as noting that chemical additives can be incorporated ***in situ*** into polyurethane foams, but Spicher does not rebut Volz's express teaching away from doing so in a method for suppressing explosion in fuel tanks. For its part, MacDonald does show lower density foams, but MacDonald also does not motivate a skilled person to reject the express teaching away from in situ chemical addition set forth in Volz.

Since there is no suggestion or motivation for combining Volz, Spicher and MacDonald to encompass claim 1, the Examiner has failed to establish that claim 1 is *prima facie* obvious. Furthermore, since claims 2, 4-6 and 13-15 all depend directly or indirectly from claim 1, the Examiner has also failed to establish that these claims are *prima facie* obvious. Therefore, Applicants respectfully request that the above rejections be withdrawn.

In addition, neither Volz nor MacDonald nor Spicher show a method in which foam to be installed in a fuel tank is foamed under controlled vacuum conditions. Such foaming conditions make it possible to foam a reaction mix with in situ incorporation of anti-static additives and still

achieve a low volume electrical resistivity in combination with a lower resultant foam density. Neither Volz nor MacDonald appreciated this advance. This is another reason to allow dependent claim 15 over the purported combination of Volz, MacDonald and Spicher. In the Final Office Action, the Examiner misapprehended the scope of claim 15 (characterizing claim 15 as being directed to "a product"). Just as claims 1, 2, 4-6 and 13 and 14 are method claims (method for suppressing explosion in a fuel tank), claim 15 also is a method claim. Claim 15 includes another method limitation not shown in the purported combination of Volz, MacDonald and Spicher, and should be allowed.

In view of the above remarks, Applicants believe the pending application is in condition for allowance.

Applicants believe no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 00124-01080-US from which the undersigned is authorized to draw.

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Respectfully submitted,

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